APPENDIX F

PACKAGE PUMP STATION DESIGN INFORMATION

Flows for Houses Served in Pelham High Service Area

Account	Base flow (gpm)*	Base flow (gpd)	Address	Street	XCOORD	YCOORD
325401	0.1386	200	44	AMHERST RD	394571.719	2964653.17
325601	0.1851	267	48	AMHERST RD	394764.862	2964756.71
325501	0.1100	158	49	AMHERST RD	394780.794	2964288.23
325702	0.0733	106	50	AMHERST RD	394900.278	2964820.11
325801	0.1683	242	51	AMHERST RD	394920.406	2964302.48
326101	0.2015	290	52	AMHERST RD	395707.655	2964698.84
325901	0.1209	174	53	AMHERST RD	395044.059	2964376.03
326001	0.0805	116	55	AMHERST RD	395149.338	2964371.53
326601	0.3482	501	57	AMHERST RD	395256.17	2964237.18
326401	0.2071	298	59	AMHERST RD	395426.919	2964259.61
326301	0.0463	67	61	AMHERST RD	395547.251	2964175.14
326201	0.0809	116	63	AMHERST RD	395628.892	2964116.33
600290	0.0860	124	72	AMHERST RD	395628.892	2964116.33
326704	0.1041	150	2	CADWELL ST	394987.086	2964088.57
326801	0.0153	22	5	CADWELL ST	394987.086	2964088.57
326901	0.2256	325	7	CADWELL ST	395022.859	2963969.97
327101	0.0794	114	9	CADWELL ST	395050.285	2963857.2
327001	0.0577	83	10	CADWELL ST	395321.526	2963951.49
327301	0.2994	431	11	CADWELL ST	395068.81	2963735.91
327201	0.0659	95	12	CADWELL ST	395305.814	2963772.99
576601	0.0952	137	9	JONES RD	395840.763	2963709.02
327901	0.0941	136	15	JONES RD	395728.875	2963636.28
327801	0.0982	141	16	JONES RD	395748.701	2963350.36
328001	0.1066	153	17	JONES RD	395527.633	2963703.31
327701	0.1075	155	18	JONES RD	395625.352	2963308.22
327601	0.0469	68	22	JONES RD	395458.888	2963251.73
327501	0.4023	579	25	JONES RD	395070.302	2963497.48
506001	0.1881	271	29	JONES RD	394878.347	2963440.92
328101	0.1358	196	30	JONES RD	394799.999	2962533.37
505901	0.1704	245	31	JONES RD	394709.583	2963437.9
328501	0.1721	248	7	S VALLEY RD	393091	2963111
328401	0.0400	58	9	S VALLEY RD	392971	2961526
328301	0.1480	213	11	S VALLEY RD	392852	2960565
328201	0.0794	114	19	S VALLEY RD	392724	2959164
	Ave (gpd)	194	34			
	Total (gpd)	6593				
	Total (gpm)	5				
	max daily (2.5 x average)	11				

***Average flow from Sept. 02 to Oct. 04**

Elementary School Usage

Date	cf	days	cfs	gpm
7/30/2010	46	107	4.97577E-06	0.002233
4/14/2010	40	68	6.80828E-06	0.003056
2/5/2010	52	98	6.14135E-06	0.002756
10/30/2009	43	95	5.23879E-06	0.002351
7/27/2009	38	97	4.53417E-06	0.002035
4/21/2009	45	91	5.72344E-06	0.002569
1/20/2009	40	95	4.87329E-06	0.002187
10/17/2008	32	95	3.89864E-06	0.00175
7/14/2008	28	73	4.43937E-06	0.001993
5/2/2008	42	99	4.91021E-06	0.002204
1/24/2008	35	94	4.3095E-06	0.001934

Town Hall Usage

Date	cf	days	cfs	gpm
7/29/2010	10	106	1.09189E-06	0.00049
4/14/2010	9	68	1.53186E-06	0.000688
2/5/2010	9	98	1.06293E-06	0.000477
10/30/2009	8	94	9.85028E-07	0.000442
7/28/2009	10	98	1.18103E-06	0.00053
4/21/2009	9	85	1.22549E-06	0.00055
1/26/2009	8	102	9.07771E-07	0.000407
10/16/2008	7	94	8.61899E-07	0.000387
7/14/2008	6	73	9.51294E-07	0.000427
5/2/2008	4	99	4.67639E-07	0.00021
1/24/2008	9	101	1.03135E-06	0.000463

Account Maintenance - MUNIS [***TOWN OF AMHERST***]

Consumption History Inquiry/Report - MUNIS [***TOWN OF AMHERST***]

My File Edit Tools Help

Tier History
Replace Hist
Demand Inq

Account

Account 325301 Customer 24107

Parcel 0 PELHAM ELEMENTARY

Location 0 PELHAM ROAD Status Active

SCHOOL

Service

Service WATER 001 WATER RATE Man NEPT Meter # 31891479

1 of 1

USAGE = CU FT

Consumption history

Read Date	Rea Bill#	P	R	Current	Usage	Repl Use	Use Days	Bill Amt	Charge Amt	Adj Bill Amt	Avg Cons
04/14/2010	458381		A	2194	40	0	68	142.00	132.00	142.00	
02/05/2010	452107		A	2154	52	0	98	181.60	171.60	181.60	
10/30/2009	445760		A	2102	43	0	95	151.90	141.90	151.90	
07/27/2009	438883		A	2059	38	0	97	135.40	125.40	135.40	
04/21/2009	432460		A	2021	45	0	91	154.00	144.00	154.00	
01/20/2009	426231		A	1976	40	0	95	138.00	128.00	138.00	
10/17/2008	419873		A	1936	32	0	95	112.40	102.40	112.40	
07/14/2008	413511		A	1904	28	0	73	99.60	89.60	99.60	
05/02/2008	407262		A	1876	42	0	99	136.00	126.00	136.00	
01/24/2008	400459		E	1834	35	0	94	115.00	105.00	115.00	

1 of 1

OVR

10:50 AM 8/18/2010

Wednesday, Aug 18, 2010 10:50 AM

Account Maintenance - MUNIS [**TOWN OF AMHERST**]

Consumption History Inquiry/Report - MUNIS [**TOWN OF AMHERST**]

My File Edit Tools Help

Tier History
Replace Hist
Demand Inq

Account

Account 600389 Customer 27590

Parcel 0 TOWN OF PELHAM

Location 41 AMHERST RD Status Active

TOWN HALL

Service

Service WATER 001 WATER RATE Man NEPT Meter # 60082011

1 of 1

USAGE = Cu FT

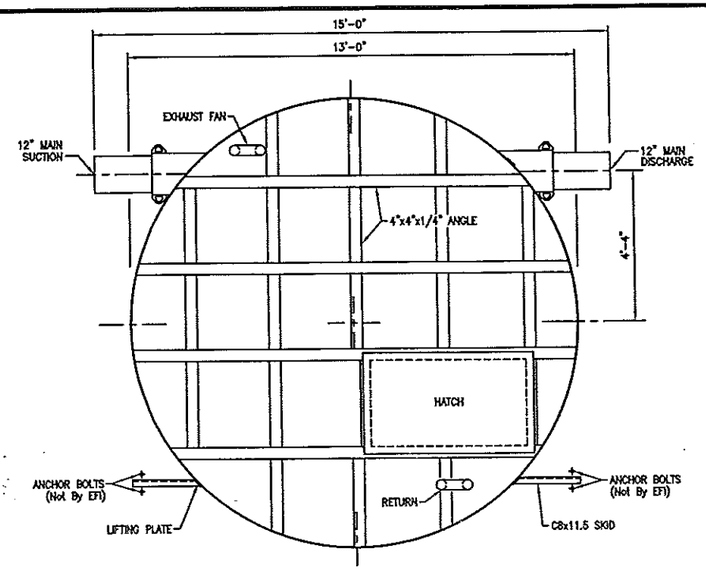
Consumption history

Read Date	Rea Bill#	P	R	Current	Usage	Repl Use	Use Days	Bill Amt	Charge Amt	Adj Bill Amt	Avg Cons
04/14/2010	458739	A		526	9	0	68	39.70	29.70	39.70	
02/05/2010	452464	E		517	9	0	98	39.70	29.70	39.70	
10/30/2009	446118	A		508	8	0	94	36.40	26.40	36.40	
07/28/2009	439241	A		500	10	0	98	43.00	33.00	43.00	
04/21/2009	432818	A		490	9	0	85	38.80	28.80	38.80	
01/26/2009	426589	A		481	8	0	102	35.60	25.60	35.60	
10/16/2008	420231	A		473	7	0	94	32.40	22.40	32.40	
07/14/2008	413869	A		466	6	0	73	29.20	19.20	29.20	
05/02/2008	407620	A		460	4	0	99	22.00	12.00	22.00	
01/24/2008	400817	E		456	9	0	101	37.00	27.00	37.00	

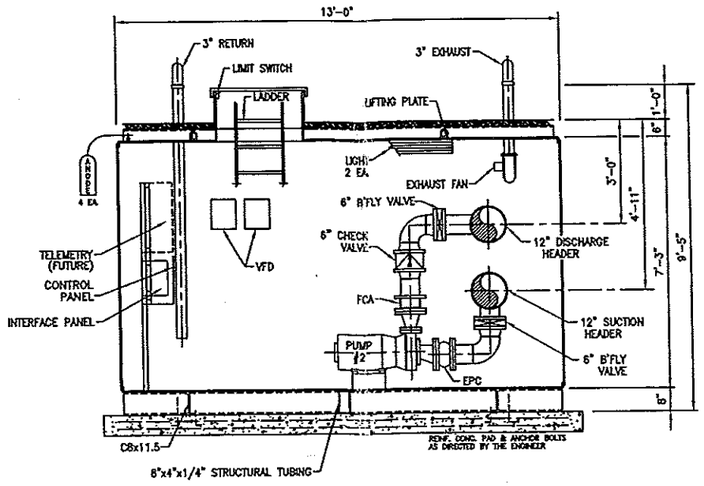
1 of 1

10:51 AM 8/18/2010

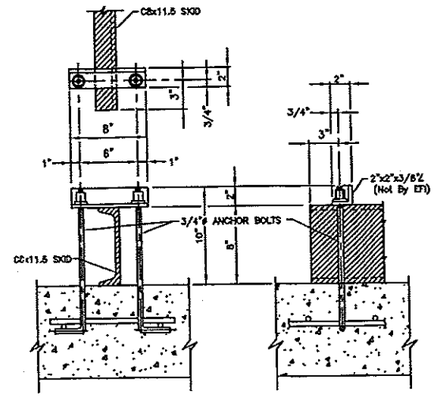
Wednesday, Aug 18, 2010 10:51 AM



EXTERIOR PLAN

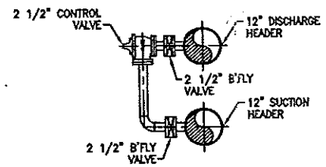


SECTION A-A

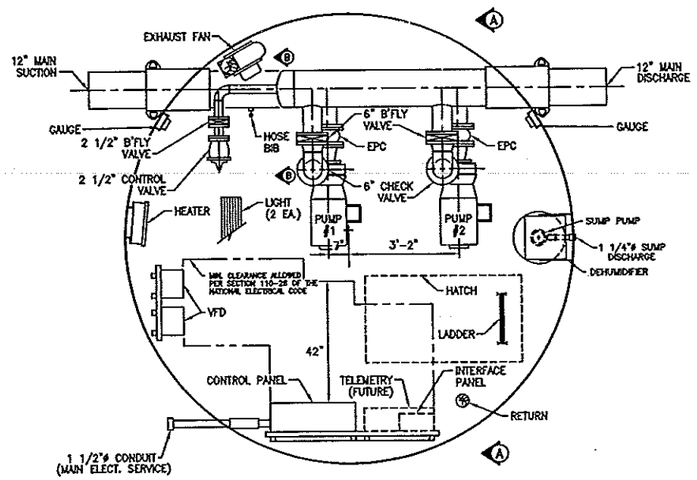


TYPICAL ANCHOR DETAIL

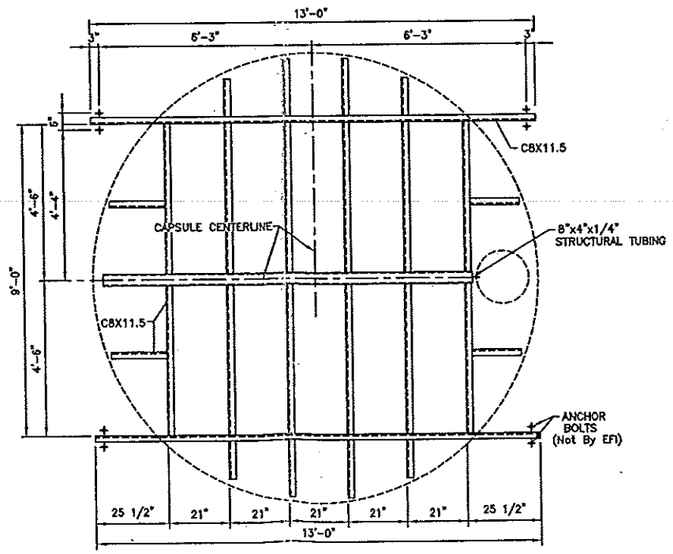
NOTE: ANCHOR CLIPS, ANCHOR BOLTS & NUTS BY INSTALLER



SECTION B-B



INTERIOR PLAN



SKID PLAN

GENERAL NOTES

ALL PIPING AND EQUIPMENT WILL BE ADEQUATELY SUPPORTED AND BRACED

FCA - FLANGED COUPLING ADAPTER
EPC - ELASTOMER PIPE CONNECTOR

PLATE & STRUCTURAL STEEL: ASTM A-36

STRUCTURAL TUBING: A500, GRADE B

CONTRACTOR'S NOTES

CONTRACTOR'S NOTE:
SCHEDULE 40 STEEL PIPE
MAIN INLET: 12.75" O.D.
MAIN OUTLET: 12.75" O.D.

SUMP PUMP AND DEHUMIDIFIER MUST BE POWERED UP AND TURNED ON IMMEDIATELY AFTER THE STATION IS SET IN PLACE.

DO NOT SHIM STATION. IT IS INTENDED THAT THE MAIN FLOOR MEMBERS BE IN CONTINUOS CONTACT WITH THE CONCRETE PAD.

DESIGN CRITERIA

Controls TELEMETRY (NOT BY EFI)
Power Service: 480 Volts, 3 Phase, 60 Cycle

PUMP DATA

Type: HORIZ., CLOSE CPLD., END SUCTION
Pump 1, 2
Capacity: 400 G.P.M. AT 150 FEET T.D.H.
Size: 3" X 4" X 8"
Motor: 25 H.P., 3500 R.P.M.

NOTE: FCA - FLANGED COUPLING ADAPTER
EPC - ELASTOMER PIPE CONNECTOR

SCALE: 1/2" = 1'-0"

AS-BUILT 9/6/05

ENGINEERED FLUID, INC.
P.O. DRAWER 723 • CENTRALIA, ILLINOIS 62801 • 618-533-1351

BOOSTER PUMP STATION
HIGHWAY 49 INPROVEMENTS
ASHLAND CITY, TN

DRAWN BY:	CHECKED BY:	JOB REF NO. 88671	DRWG. NO. 88671-B-001.
RD			

APPENDIX G

LEED MEMORANDUM

MEMORANDUM **Tighe&Bond**

Evaluation of LEED Certification Feasibility
Centennial WTP Upgrade Evaluation & Preliminary Design

TO: JNM, CLS

FROM: ACM

COPY: File

DATE: September 22, 2010

As part of the Centennial Water treatment Plant (WTP) building upgrade project, we evaluated the potential to achieve Leadership in Energy and Environmental Design (LEED) certification as part of the project. The US Green Building Council revised the LEED rating systems in 2009, resulting in a system in which there are 100 possible base points plus additional points for Innovation in Design and Regional Priority credits. Buildings can qualify for one of four levels of certification:

- **Certified** - 40 - 49 points
- **Silver** - 50 - 59 points
- **Gold** - 60 - 79 points
- **Platinum** - 80 points and above

Points are distributed across credit categories including Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation in Operations, and Regional Priorities. Prerequisites in most categories receive no points, however are mandatory for all projects.

Based on review of the project scope, various potentially applicable LEED rating systems, and LEED minimum program requirements (MPR), it was determined that the LEED 2009 Existing Building: Operation & Maintenance (EBOM) rating system is the most appropriate for this project. For this evaluation, the MPRs, certification prerequisites, and credits were reviewed (in this order) to determine if project parameters would result in the project not being able to attain certification.

Minimum Program Requirements

Table 1-1 indicates MPRs and whether or not the project and facility as currently designed and operated meets the minimum requirements. The description of the requirement intent provided is specific to the EBOM rating system and this project. As indicted in the table; the project as currently contemplated complies with the MPRs.

TABLE 1-1
Compliance with Minimum Program Requirements

Minimum Program Requirement	Description (EBOM)	Project Compliance
Must comply with applicable environmental laws and regulations	Applies to project-related work and all normal building operations	Yes
Must be a complete, permanent building space	Project must be designed for, constructed on, and operated on a permanent location on already existing land and must include at least one existing commercial, institutional, or high-rise residential building in its entirety	Yes
Must use a reasonable site boundary	The site boundary must include all contiguous land that is associated with and supports normal building operations and that will be disturbed for the project. The project proponent must own the land within the site boundary, unless the land supports normal building operations. Only one certified building per site boundary limits	Yes
Must comply with minimum floor area requirements	The project must include a minimum of 1,000 square feet of gross floor area	Yes
Must comply with minimum occupancy rates	The project must serve one or more full time equivalent (FTE) occupant(s) (annual average). Projects with less than one annualized FTE may not pursue optional credits from the Indoor Environmental Quality category (however all prerequisites must be met)	Yes
Must allow U.S. Green Building Council (USGBC) access to whole-building energy and water usage data	All certified projects must commit to providing USGBC all available actual whole-project energy and water usage data for a period of at least 5 years	Yes
Must comply with a minimum building area to site area ratio	The gross floor area of the project building must be no less than 2% of the gross land area within the project boundary	Yes

Prerequisite Compliance

Prerequisites were reviewed to determine if the Centennial WTP upgrade project would meet the requirements. If any prerequisites cannot be achieved, certification cannot be sought. This section includes a table listing the prerequisites, a brief description of the prerequisite, and a summary of how to comply. Based on review of the EBOM prerequisites, it appears all of the requirements can be met relatively easily, and some can be completed by DPW staff.

TABLE 1-2
Prerequisites

Credit Category/Prerequisite	Description	Compliance Summary
Water Efficiency		
WEp1: Minimum Indoor Plumbing Fixture and Fitting Efficiency	Assess the efficiency of basic indoor plumbing fixtures (faucets, toilets, urinals, and showerheads), and determine how much potable water is consumed relative to a LEED baseline case	If current bathroom, kitchen, and janitorial closet fixtures are already highly efficient, the prerequisite will likely be met. If installed fixtures are older and exceed the baseline, they will require upgrading
Energy and Atmosphere		
EAp1: Energy Efficiency Best Management Practices - Planning, Documentation and Opportunity Assessment	Document operational procedures and best practices for energy efficiency	Submit (prepare if needed) the following documents: Systems Narrative, Sequence of Operations, and Preventive Maintenance Plan. Complete ASHRAE Level 1 Walkthrough energy audit and submit documentation
EAp2: Minimum Energy Efficiency Performance	Building has Energy Star rating of ≥69 or ≥19% better than national average	Use EPA's Energy Star Portfolio Manager to track 12 months of data for all energy consumption. Document performance if prerequisite is met. If building is relatively inefficient, conduct energy audit and make operational changes or capital investments to improve energy efficiency
EAp3: Fundamental Refrigerant Management	Zero use of CFC-based refrigerants in HVAC&R base building systems unless a third-party audit shows that system replacement or conversion is not economically feasible, or it is demonstrated that a phase-out plan for CFC-based refrigerants is in place	Compliance if building has no CFCs, or if easily eliminated. If CFC are present in quantity, either implement a five-year CFC phase-out plan or show that both conversion and replacement of equipment is not economically feasible
Materials and Resources		
MRp1: Sustainable Purchasing Policy	Prepare sustainable purchasing policy to establish guiding principles for the purchase of environmentally preferable products (EPP) and materials when economically feasible	Prepare EPP Purchasing Policy document. Policy needs to adhere to the specifications of the USGBC's "Program, Plan and Policy Model for LEED-EBOM" to guide purchasing decisions at the project building

TABLE 1-2
Prerequisites

Credit Category/Prerequisite	Description	Compliance Summary
MRp2: Solid Waste Management Policy	Create and implement a solid waste management (SWM) policy aimed at reducing the amount of waste sent to landfill from the building	Create SWM policy with measureable goals that defines the procedures for managing waste streams covered by credits MRc7, MRc8 and MRc9, as well as mercury-containing lamps. Documenting the policy in practice, or compliance with those credits, is not a requirement
Indoor Environmental Quality		
IEQp1: Minimum Indoor Air Quality Performance	Comply with one of two cases: **Case 1: Projects Able to Meet ASHRAE Standard 62.1–2007** Modify or maintain each outside air intake, supply air fan and/or ventilation distribution system to supply at least the outdoor air ventilation rate required by ASHRAE Standard 62.1–2007 Ventilation Rate Procedure under all normal operating conditions **Case 2: Projects Unable to Meet ASHRAE Standard 62.1–2007** If meeting ASHRAE Standard 62.1–2007 ventilation rates is infeasible because of the physical constraints of the existing ventilation system, modify, or maintain the system to supply at least 10 cfm of outdoor air per person under all normal operating conditions. AND: Show compliance with the applicable requirement above (Case 1 or Case 2) through measurements taken at the system level	Measure outdoor air flow in each air-handling unit and compare performance against ASHRAE Standard 62.1-2007 requirements. ASHRAE and USGBC provide calculators for determining the required rates of outdoor air flow. Modify outside air intakes as necessary to comply with one of the two cases. Demonstrate compliance with one of the cases, implement and maintain HVAC maintenance program, and test and maintain building exhaust systems

TABLE 1-2
Prerequisites

Credit Category/Prerequisite	Description	Compliance Summary
	Implement and maintain an HVAC system maintenance program to ensure the proper operations and maintenance of HVAC components as they relate to outdoor air introduction and exhaust Test and maintain the operation of all building exhaust systems, including bathroom, shower, kitchen and parking exhaust systems	
IEQp2: Environmental Tobacco Smoke (ETS) Control	Prevent or minimize exposure of building occupants, indoor surfaces and systems to environmental tobacco smoke	Prohibit smoking indoors. Establish building-wide policy prohibiting smoking indoors and within 25 feet of the building's entrances, outdoor air intakes, and operable windows
IEQp3: Green Cleaning Policy	Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants	Prepare a green cleaning policy that lays the groundwork for achieving the IEQ credits for green cleaning

Credit Overview

An evaluation of the feasibility of achieving certification based on the proposed updates to the WTP and overall facility operations was completed in order to assist the Town in determining if LEED certification should be pursued. Table 1-3 includes a list of potential credits and point values, as well as descriptions of the credit intent. We have included a check box to indicate whether or not the credit can be achieved by completing the proposed facility updates. The purpose of this notation is to emphasize those credits that would require little or no added effort beyond what will already be completed for the proposed updates. We have also indicated which credits would likely not achieved, and tallied the points of those credits that are attainable, in order to give an indication of the potential level of certification.

In summary, it appears that 53 of the potential credits would be relatively easy to achieve. This analysis does not include a detailed assessment of the potential cost or time involved in pursuing the credit, which is recommended to make a final decision on pursuing LEED certification. Of the 53 credits, three are considered a regional priority and an additional three points would be awarded if those credits are achieved. The sum of the credits, 56, would allow for Silver certification, however it is recommended that Certification be sought in order to a) potentially reduce the number of credits pursued, and b) allow for pursuit of more credits than needed to provide a margin of error in the event not all credits are achieved.

TABLE 1-3
Potential Credits

Category/Credit	Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
						Easy	Mod	Hard	
Sustainable Sites									
SSc1 LEED Certified Design & Construction	Rewards environmentally sensitive building design and construction, enabling high-performance building operations to be more easily achieved.	4	N	0			Not possible		Must be previously LEED certified building under specific rating system.
SSc2 Building Exterior and Hardscape Management Plan	Encourages environmentally sensitive building exterior and hardscape management practices that provide a clean, well-maintained and safe building exterior while supporting high-performance building operations.	1	Y	1	1	✓			RP credit
SSc3 Integrated Pest management, Erosion Control, and Landscape Management	Preserves ecological integrity, enhance natural diversity and protect wildlife while supporting high-performance building operations and integration into the surrounding landscape.	1	Y	1		✓			
SSc4 Alternative Commuting Transportation	Reduces pollution and land development impacts from automobile use for commuting.	3 to 15	N	0	0		✓		RP credit (25%)
SSc5 Site Development - Protect and Restore Open Habitat	Conserves existing natural site areas and restore damaged site areas to provide habitat and promote biodiversity.	1	Y	1		✓			
SSc6 Stormwater Quantity Control	Limits disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from stormwater runoff and eliminating contaminants.	1	Y	1	1	✓			RP credit
SSc7.1 Heat Island Reduction - Nonroof	Reduces heat islands to minimize impacts on microclimates and human and wildlife habitats.	1	N	0			✓		
SSc7.2 Heat Island reduction - Roof	Reduces heat islands to minimize impacts on microclimates and human and wildlife habitats.	1	Y	1		✓			Easy if new roof already planned. Spec compliant materials - may not add cost.
SSc8 Light Pollution Reduction	Minimizes light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction and reduce development impact from lighting on nocturnal environments.	1	Y	1		✓			A simple credit to achieve if you use a building automation system (BAS) to control lighting. If not, compliance with the credit can be more complex, but not necessarily very expensive. Lighting upgrades are part of project so this is considered an easy credit to achieve.
Water Efficiency									
WEc1 Water Performance Measurement	Measures building and subsystem water performance over time to understand consumption patterns and identify opportunities for additional water savings.	1 to 2	Y	2		✓			Is metering currently in place to determine the total water consumption of the project building and grounds, either in the form of a single overall meter or multiple submeters (1 pt if yes)? The addition of a submeter on at least one water subsystem gets 2 points.

	Category/Credit	Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
							Easy	Mod	Hard	
WEc2	Additional Indoor Plumbing Fixture and Fitting Efficiency	Maximizes indoor plumbing fixture and fitting efficiency within buildings to reduce the use of potable water1 and consequent burden on municipal water supply and wastewater systems.	1 to 5	Y	3		✓			This credit rewards project buildings that exceed the requirements specified in prerequisite. Additional points are earned if the performance calculations indicate that indoor potable water usage is at least 10% less than indicated in the credit baseline. Projects may be awarded an innovation point for exemplary performance by achieving a potable water savings of 35% or greater. Considered easy since upgrades are already planned. Could earn up to 5 points for more efficiency.
WEc3	Water Efficient Landscaping	Limit or eliminate the use of potable water or other natural surface or subsurface resources available on or near the project site, for landscape irrigation.	1 to 5	Y	1		✓			Reduce use of potable water for irrigation by 50%–100% compared with a baseline irrigation system typical for the region. Increased percent reduction (which equals more points) could be achieved.
WEc4	Cooling Tower Water Management	Reduce potable water consumption for cooling tower equipment through effective water management and/or use of nonpotable makeup water.	1 to 2	N	0					No cooling towers at facility.
Energy and Atmosphere										
EAc1	Optimize Energy Performance	Achieve increasing levels of operating energy performance relative to typical buildings of similar type to reduce environmental and economic impacts associated with excessive energy use.	1 to 18	Y	8				✓	Not an energy star-eligible building type; therefore need to calculate using USGBC calculator. More points may be achievable through design of planned upgrades.
EAc2.1	Existing Building Commissioning - Investigation and Analysis	Through a systematic process, to develop an understanding of the operation of the building's major energy-using systems, options for optimizing energy performance and a plan to achieve energy savings.	2	Y	2		✓			Either perform commissioning or an ASHRAE Level II Energy Audit. Both processes are relatively easy. The auditing process is generally less rigorous than commissioning. T&B could easily do audit for client, and would assist in design.
EAc2.2	Existing Building Commissioning - Implementation	Implement minor improvements and identify planned capital projects to ensure that the building's major energy-using systems are repaired, operated and maintained effectively to optimize energy performance.	2	Y	2		✓			Have to do EAc2.1 in order to pursue EAc2.2. project team implements all of those energy efficiency measures identified as low-cost and no-cost. Easy to achieve with planned upgrades.
EAc2.3	Existing Building Commissioning - Ongoing Commissioning	Use commissioning to address changes in facility occupancy, use, maintenance and repair. Make periodic adjustments and reviews of building operating systems and procedures essential for optimal energy efficiency and service provision.	2	Y	2		✓			Ongoing commissioning involves performing critical elements of the retrocommissioning process, repeatedly over a series of two-year cycles. The goal is to optimize system performance and continue to fine-tune it, actively preventing problems for the lifetime of the building.

	Category/Credit	Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
							Easy	Mod	Hard	
EAc3.1	Performance Management - Building Automation System	To provide information to support the ongoing accountability and optimization of building energy performance and identify opportunities for additional energy-saving investments.	1	Y	1		✓			Project building must have a Building Automation System (BAS) that monitors and controls HVAC and lighting systems. Minimum BAS functions for HVAC include monitoring the status of sensors and controlled devices, scheduling equipment off when not in use, scheduling set points and setbacks, and trending equipment status. Minimum BAS functions for lighting includes scheduling lights to turn off during unoccupied times. If BAS is being or could be considered as part of upgrades, this is an easy credit.
EAc3.2	Performance Management - System-Level Metering	Provide accurate energy-use information to support energy management and identify opportunities for additional energy-saving improvements.	1 to 2	Y	1			✓		The use of building systems submetering to allow operational staff to analyze specific energy loads and to pinpoint potential areas for improvement in system-level or equipment performance. Although submetering can often lead to energy use reductions, the credit does not require you to demonstrate them.
EAc4	On-Site and Off-Site Renewable Energy	Encourage and recognize increasing levels of on and off-site renewable energy to reduce environmental and economic impacts associated with fossil fuel energy use.	1 to 6	Y	2	1		✓		RP credit (3%25%). More points possible; need to conduct more detailed assessment to determine amount to pursue.
EAc5	Enhanced Refrigerant Management	Reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global climate change.	1	Y	1		✓			More of an auditing exercise to determine CFCs present. significant reduction or elimination of all refrigerants in base building systems, and at the very least, works to promote use of refrigerants that have the lowest global warming potential. Not easily achievable if CFCs being used; retrofitting not typically feasible. Assumed no CFCs and added point to total. If HVAC&R units are being replaced as part of upgrade, this is a point earned.
EaC6	Emissions Reduction Reporting	Document the emissions reduction benefits of building efficiency measures.	1	Y	1		✓			Easily achieved by tracking monthly energy consumption of the project building through the use of Portfolio Manager. In order to comply, you simply need to generate a Statement of Energy Performance (SEP) that shows the associated GHG emissions.

Category/Credit		Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
							Easy	Mod	Hard	
Materials and Resources										
MRc1	Sustainable Purchasing - Ongoing Consumables	Reduce the environmental and air quality impacts of the materials acquired for use in the operations and maintenance of buildings.	1	Y	1			✓		Get the credit point if 60% (by cost) of ongoing consumable purchases meet the Environmentally Preferable Purchasing criteria. Ongoing consumables for this credit include, at a minimum, these low-cost items: Paper (printing and copy paper, notebooks, notepads, envelopes), toner cartridges, binders, batteries, and desk accessories. Optional to include additional ongoing consumables such as flatware, disposable dining ware, cardboard shipping boxes and other consumables.
MRc2	Sustainable Purchasing - Durable Goods	Reduce the environmental and air quality impacts of the materials acquired for use in the operations and maintenance of buildings.	1 to 2	Y	1		✓			This is easy with planned upgrades. Any purchases of durable goods during the performance period earns this credit and there is no minimum purchasing requirement. 1 pt for electric-powered equipment; second point for furniture.
MRc3	Sustainable Purchasing Facility Alterations and Additions	Reduce the environmental and air quality impacts of the materials acquired for use in the upgrade of buildings	1	N	0			✓		
MRc4	Sustainable Purchasing - Reduced Mercury in Lamps	Establish and maintain a toxic material source reduction program to reduce the amount of mercury brought onto the building site through purchases of lamps.	1	Y	1		✓			Use of low-mercury fluorescent lamps, or other mercury-free lighting technologies.
MRc5	Sustainable Purchasing - Food	Reduce the environmental and transportation impacts associated with food production and distribution.	1	N	0	0		✓		RP credit. Requires 25% to come from certain sources, and typically vendors don't have products that meet requirements.
MRc6	Solid Waste Management - Waste Stream Audit	Facilitate the reduction of ongoing waste and toxins generated by building occupants and building operations that are hauled to and disposed of in landfills or incineration facilities.	1	Y	1			✓		A waste stream audit should be done by an experienced third-party. The waste stream at the facility is likely minimal - this may not be a difficult point to achieve, although there is a cost associated with a third-party audit. The entire waste stream needs to be audited.

	Category/Credit	Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
							Easy	Mod	Hard	
MRc7	Solid Waste Management - Ongoing Consumables	Facilitate the reduction of waste and toxins generated from the use of ongoing consumable products by building occupants and building operations that are hauled to and disposed of in landfills or incineration facilities.	1	N	0	0		✓		RP credit. A waste management policy for ongoing consumables was already developed under MRp2; this credit involves implementing that policy. "Ongoing consumables" refers to all goods with a low per-unit cost that are regularly used and replaced. This can include, but is not limited to: paper, toner cartridges, glass, metals, plastics, cardboard, batteries, fluorescent lamps, food waste, and landscaping waste. The waste audit conducted for MRc6: Solid Waste Management — Waste Stream Audit cannot be used to show compliance with this credit. The waste audit is a one-time, detailed snapshot of waste profiles, whereas this credit requires ongoing performance based on monthly tracking of key waste streams. To achieve certification, the facility already has to create a solid waste management policy for durable goods in order to meet the prerequisite MRp2. This credit deals with the implementation of that policy. Durable goods include electronics, equipment, appliances, and furniture. Relatively easy to achieve, this credit requires the diversion of at least 75% of the durable goods waste stream from landfilling. Generally, durable goods are not sent to the landfill and can be easily collected on a quarterly or annual basis.
MRc8	Solid Waste Management - Durable Goods	Facilitate the reduction of waste and toxins generated from the use of durable goods by building occupants and building operations that are hauled to and disposed of in landfills or incineration facilities.	1	Y	1			✓		
MRc9	Solid Waste Management - Facility Alterations and Additions	Divert construction and demolition debris from disposal to landfills and incineration facilities. Redirect recyclable recovered resources back to the manufacturing process and reusable materials to appropriate sites.	1	Y	1			✓		Most projects don't qualify for this credit because they don't have alterations or additions planned for the performance period. Prior to deciding to pursue this credit, make sure upgrades meet the LEED definition, and make sure the construction will take place during the performance period. Specifications can require subs to provide appropriate materials with minimal packaging to reduce effort, or that subs have to recycle the material themselves.

	Category/Credit	Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
							Easy	Mod	Hard	
Indoor Environmental Quality										
IEQc1.1	IAQ Best Management Practices - Increased Ventilation	Enhance indoor air quality (IAQ) by optimizing practices to prevent the development of indoor air quality problems in buildings, correcting indoor air quality problems when they occur and maintaining the well-being of the occupants.	1	Y	1		✓			This credit requires development and implementation of an ongoing indoor air quality (IAQ) management program. The credit is usually low-cost to implement and is non-technical in nature.
IEQc1.2	IAQ Best Management Practices - Outdoor Air Delivery Monitoring	Provide capacity for ventilation system monitoring to help sustain occupant comfort and well-being.	1	Y	1		✓			If a BAS, or some level of existing outdoor airflow monitoring, can be installed as part of the planned upgrades, this credit can be easy to achieve.
IEQc1.3	IAQ Best Management Practices - Increased Ventilation	Provide additional outdoor air ventilation to improve indoor air quality (IAQ) for improved occupant comfort, well-being and productivity.	1	Y	1		✓			This credit is already addressed as part of the compliance process for IEQp1: Minimum Indoor Air Quality Performance. If the measurements for IEQp1 indicate that the building has ventilation rates that are at least 30% better than ASHRAE 62.1-2007 for every ventilation distribution system, no further action is required, other than checking that any needed documentation is uploaded. Should be achievable with upgrades.
IEQc1.4	IAQ Best Management Practices - Reduce Particulates in Air Distribution	Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants, which adversely affect air quality, human health, building systems and the environment.	1	Y	1		✓			Must use a high level of air filters at outside air intakes and inside air-recirculation returns. MERV 13 filters must be used at all outside air intakes and at all inside air-recirculation returns—no spaces may be omitted. Historically, MERV 13 filters have been more costly than standard filtration media, but the cost premium is dropping as demand increases. MERV 13 filters are now often cost-competitive if not cost-neutral. can be incorporated into HVAC upgrades being considered.
IEQc1.5	IAQ Best Management Practices - Facility Alterations and Additions	Prevent indoor air quality (IAQ) problems resulting from any construction or renovation projects to help sustain the comfort and well-being of construction workers and building occupants.	1	Y	1		✓			You can earn this credit by developing an IAQ management plan for facility alterations or additions on your project site (even if there are no actual alterations or additions conducted during the performance period).
IEQc2.1	Occupant Comfort - Occupant Survey	Provide for the assessment of building occupants' comfort as it relates to thermal comfort, acoustics, indoor air quality (IAQ), lighting levels, building cleanliness and any other comfort issues.	1	N	0			✓		Implement an occupant comfort survey and a system to collect ongoing feedback on indoor environmental comfort. With small workforce at plant, the percentages needed of satisfied employees may not be attainable.

Category/Credit	Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
						Easy	Mod	Hard	
IEQc2.2 Controllability of Systems - Lighting	Provide a high level of lighting system control by individual occupants or groups in multi-occupant spaces (e.g., classrooms or	1	Y	1		✓			Provide lighting controls for at least 50% of occupants, which is not technically difficult to achieve. Need to conduct a thorough inventory of lighting controls to verify compliance.
IEQc2.3 Occupant Comfort - Thermal Comfort Monitoring	support the appropriate operations and maintenance of buildings and building systems so that they continue to meet target building performance goals over the long term and provide a comfortable thermal environment that supports the productivity and well-being of building occupants.	1	N	0			✓		Two forms of thermal comfort monitoring need to be implemented for this credit: 1) Continuous monitoring of air temperature and humidity; and 2) Periodic measurements of air speed and radiant temperature. This credit addresses the conditions that building occupants experience, not the measured conditions inside the ductwork or HVAC system. If equipment can be installed as part of upgrades, moderately difficult to achieve. This is because hand held measurements are required as well.
IEQc2.4 Daylight and Views	Provide building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.	1	N	0				✓	If building was designed to maximize daylight and views, it's less onerous to comply, and documenting compliance will be easier. But requirements are burdensome, especially when building was not designed for aesthetic comfort.
IEQc3.1 Green Cleaning - High Performance Cleaning Program	Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment.	1	Y	1		✓			The groundwork for this credit is lain by developing a green cleaning policy under the prerequisite IEQp3. This credit involves enhancing the policy that was already required to be develop. All that needs to be done is to add a few elements to the green cleaning policy.
IEQc3.2 Green Cleaning - Custodial Effectiveness Assessment	Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, by implementing, managing and auditing cleaning procedures and processes.	1	Y	1		✓			If the building is kept relatively clean, this credit should be easy to achieve. Requires an audit that, if performed professionally and objectively, can help evaluate the quality of cleaning services and highlight areas of the building that present particular cleaning challenges.
IEQc3.3 Green Cleaning - Purchasing of Sustainable Cleaning Products and Materials	Reduce the environmental impacts of cleaning products, disposable janitorial paper products and trash bags.	1	Y	1		✓			To earn this credit, 30% of cleaning products and materials purchases must meet the credit criteria. Can earn exemplary performance for this credit if 60% of your purchases meet the credit criteria.

	Category/Credit	Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
							Easy	Mod	Hard	
IEQc3.4	Green Cleaning - Sustainable Cleaning Equipment	Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants that adversely affect air quality, human health, building finishes, building systems and the environment, from powered cleaning equipment.	1	Y	1			✓		Fairly straightforward credit requirements. Must use at least one piece of cleaning equipment in order to be eligible; 20% of all cleaning equipment must comply with the equipment-specific criteria; and 100% of equipment purchased during the performance period must comply with the criteria.
IEQc3.5	Green Cleaning - Indoor Chemical and Pollution Source Control	Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, that adversely affect air quality, human health, building finishes, building systems and the environment.	1	Y	1		✓			Earning this credit is easy for most projects. Make sure there are 10 feet worth of entryway system at main building entrances and keep them clean.
IEQc3.6	Green Cleaning - Integral Pest Management	Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants that adversely affect air quality, human health, building finishes, building systems and the environment.	1	Y	1		✓			Relatively easy to achieve as long as chosen best practices are incorporated directly into vendor contracts and standard operating procedures.
Innovation in Operations										
IOc1	Innovation in Operations	Provide building operations, maintenance and upgrade teams with the opportunity to achieve additional environmental benefits achieved beyond those already addressed by the LEED 2009 for Existing Buildings: Operations & Maintenance Rating System.	1	Y	1			✓		Can be met several ways; 1) Innovation in Operations—Deliver an environmental benefit not currently addressed in the existing LEED rating system; 2) Exemplary Performance — Exceed LEED performance thresholds in existing credits, typically by doubling the requirements or by achieving the next logical increment; or 3) Pilot Credit—Test-drive a credit from the official LEED Pilot Credit library.
IOc2	LEED Accredited Professional	Support and encourage the operations, maintenance, upgrade and project team integration required by LEED to streamline the application and certification process.	1	Y	1		✓			Easy to earn this point by including a LEED AP as an integral member of the project team.
IOc3	Documenting Sustainable Building Cost Impacts	Document sustainable building cost impacts.	1	Y	1			✓		This credit involves a review and analysis of the building's operational expenses. The goal is to better understand the financial impact on overall operating costs of improvements made during the LEED performance period.

Category/Credit	Brief Credit Intent Description[1]	Possible Points	Credit Pursued	Points Toward Cert.	Regional Priority Credit Sought	Relative Difficulty to Obtain			Comments
						Easy	Mod	Hard	
Regional Priority									
RPc1 Regional Priority	Provide an incentive for the achievement of credits that address geographically specific environmental priorities.	1 to 4	Y		3				Consider these bonus points; achieved if credits that have been designated as having regional significance are achieved. For the Amherst zip code, the following credits are designated Regional Priority credits: SSc2, SSc4 (25%), SSc6, EAc4 (3%/25%), MRc5, MRc7). Of those credits, this review indicates

Notes:
1 From US Green Building Council document descriptions.

Total Potential Points Pursued:	53
Regional Priority Credits:	3
Total:	**56**
Recommended Certification Level:	Certified

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Tighe&Bond

Project: Centennial Water Treatment Plant
Location: Pelham, MA

Estimate Type: ☑ Conceptual ☐ Preliminary Design ☐ Design Development ☐ Construction ☐ Change Order ____ % Complete

Prepared By: CLS/JNM
Date Prepared: 10/8/2010
T&B Project No.: 10023324-01

Spec. Section	Item No.	Description	Qty	Units	Material/Installed Cost $/Unit	Material/Installed Cost Total	Installation $/Unit	Installation Total	Total
DIVISION 1 - GENERAL CONDITIONS									
	1	Gen. Conditions - 15%	1	LS	$194,000	$194,000			$194,000
SUBTOTAL - DIVISION 1						**$194,000**			**$194,000**
DIVISION 2 - SITE WORK									
02075	1	Geosynthetics	1	LS	$2,000	$2,000			$2,000
02200	2	Site Preparation							
	a	Site Preparation (Pump Station)	1	LS	$5,000	$5,000			$5,000
	b	Haybales & Silt Fence (Pump Station)	150	LF	$8	$1,200			$1,200
	c	Site Preparation (Equalization Basin)	1	LS	$5,000	$5,000			$5,000
	d	Haybales & Silt Fence (Equalization Basin)	150	LF	$8	$1,200			$1,200
02210	3	Subsurface Investigations							
	a	Subsurface Investigations (Pump Station)	1	LS	$2,000	$2,000			$2,000
	b	Subsurface Investigations (Equalization Basin)	1	LS	$2,000	$2,000			$2,000
02220	4	Demolition							
	a	Amherst Rd. Valve Pit	1	LS	$2,500	$2,500			$2,500
	d	Saw Cut and Remove Bottom 18" from Interior Wall Panels	400	LF	$40.00	$16,000			$16,000
	e	Remove Tube Settlers	3	EA	$750.00	$2,250			$2,250
	f	Remove Valves	29	EA	$200.00	$5,800			$5,800
	g	Remove Electrical Equipment	1	LS	$2,500.00	$2,500			$2,500
	h	Remove HVAC Equipment	1	LS	$2,000.00	$2,000			$2,000
	i	Remove Lagoon Equipment & Backfill	1	LS	$3,500.00	$3,500			$3,500
	j	Abandon Septic Tank and Associated Equipment	1	LS	$1,000.00	$1,000			$1,000
02315	5	Excavation/Backfill/Compaction							
	a	New Pump Station	1	LS	$2,500	$2,500			$2,500
	b	Equalization Basins	1	LS	$5,000	$5,000			$5,000
	c	Fill for Septic Tank	1	LS	$1,000	$1,000			$1,000
02320	6	Borrow Materials							
	a	New Pump Station	1	LS	$1,000	$1,000			$1,000
	b	Equalization Basins	1	LS	$3,000	$3,000			$3,000
02501	7	Disinfection & Testing	1	LS	$4,000	$4,000			$4,000
02514	8	DI Piping							
	a	8" Ductile Iron Water Main Pipe and Fittings	150	LF	$200	$30,000			$30,000
02515	9	PVC							
	b	Plumbing to Sewer System from Plant	150	LF	$50	$7,500			$7,500
02530	10	Manholes & Catchbasins							
02900	11	Landscaping	1	LS	$5,000	$5,000			$5,000

Tighe&Bond

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Spec. Section	Item No.	Description	Qty	Units	Material/Installed Cost $/Unit	Material/Installed Cost Total	Installation $/Unit	Installation Total	Total
02920	12	Loam and Seed	1	LS	$1,500	$1,500			$1,500
SUBTOTAL - DIVISION 2						**$114,450**			**$114,450**
DIVISION 3 - CONCRETE									
03300	1	Cast in Place Concrete							
	a	Install 8" x 16" Concrete Curb	15	CY	$1,000	$15,000			$15,000
03485	2	Precast Concrete Tanks	2	LS	$40,000	$80,000	$16,000	$32,000	$112,000
SUBTOTAL - DIVISION 3						**$95,000**			**$127,000**
DIVISION 6 - WOOD & PLASTICS									
06630	2	Hypalon Baffles	160	LF	$20	$3,200			$3,200
SUBTOTAL - DIVISION 6						**$3,200**			**$3,200**
DIVISION 7 - THERMAL & MOISTURE PROTECTION									
07620		Downspouts and Gutters	350	LF	$8	$2,800			$2,800
SUBTOTAL - DIVISION 7						**$2,800**			**$2,800**
DIVISION 8 - DOORS & WINDOWS									
08600		Skylights	1	LS	11000	$11,000			$11,000
SUBTOTAL - DIVISION 8						**$11,000**			**$11,000**
DIVISION 9 - FINISHES									
00990	1	Painting							
	a	Sand Blast and 3 Coat Paint System for (3) Tanks	5,100	SF	$25	$127,500			$127,500
	b	Concrete Floor	1,850	SF	$10	$18,500			$18,500
	c	Piping	1	LS	$5,000	$5,000			$5,000
SUBTOTAL - DIVISION 9						**$151,000**			**$151,000**
DIVISION 10 - SPECIALTIES									
10440	1	Signage for Ammonia and Chlorine Rooms	1	LS	$1,000	$1,000			$1,000
SUBTOTAL - DIVISION 10						**$1,000**			**$1,000**

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Prepared By: CLS/JNM
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Spec. Section	Item No.	Description	Qty	Units	Material/Installed Cost $/Unit	Material/Installed Cost Total	Installation $/Unit	Installation Total	Total
DIVISION 11 - EQUIPMENT									
11210	1	Roberts Filter Equipment							
	a	(6) Vertical Flocculators, (6) motors, (12) SCR controllers	1	LS	$64,500	$64,500	$25,800	$25,800	$90,300
	b	(3) lots of Tube Settlers	1	LS	$33,000	$33,000	$13,200	$13,200	$46,200
	c	New Filter Media	1	LS	$19,500	$19,500	$7,800	$7,800	$27,300
	d	(3) ARIES Managed Air Scour Units[2]	1	LS	$38,000	$38,000	$15,200	$15,200	$53,200
11261	2	Vacuum Feed System							
	a	Chlorinator Feed System	1	LS	10,000	$10,000	$4,000	$4,000	$14,000
	b	Ammonia Feed System	1	LS	6,000	$6,000	$2,400	$2,400	$8,400
	3	Chlorine Emergency Kit A	1	EA	$2,200	$2,200			$2,200
11262	4	UV Disinfection System	1	LS	$80,000	$80,000	$32,000	$32,000	$112,000
11315	5	Package Control Valve/Pump Station	1	LS	$75,000	$75,000	$30,000	$30,000	$105,000
11510	6	Air Accumulator[3]	2	EA	$1,500	$3,000	$600	$1,200	$4,200
SUBTOTAL - DIVISION 11						**$331,200**		**$131,600**	**$462,800**
DIVISION 13 - SPECIAL CONSTRUCTION									
13126	1	Pre-Engineered Building							
	g	Install Base Angle to Top of Curb, Secure Wall Panel	400	LF	$18	$7,200			$7,200
13420	2	Instrumentation							
	a	Magnetic Flow Meter	1	EA	$7,000	$7,000	$2,800	$2,800	$9,800
	b	Pressure Level Transducers	3	EA	$1,000	$3,000	$400	$1,200	$4,200
	c	Turbidity Meter	3	EA	$3,500	$10,500	$1,400	$4,200	$14,700
13455	3	SCADA System Improvements	1	LS	$20,000	$20,000			$20,000
SUBTOTAL - DIVISION 13						**$47,700**		**$8,200**	**$55,900**
DIVISION 15 - MECHANICAL									
15060	1	Pipe Hangers and Supports	1	LS	$1,000	$1,000			$1,000
15075	2	Mechanical Identification	1	LS	$500	$500			$500
15101	3	Ductile Iron Pipe and Fittings							
	a	12" DI Pipe modifications for UV	50	LF	$250	$12,500			$12,500
15110	4	Valves[4]							
	a	4" Butterfly Valves, Manual	6	EA	$1,300	$7,800	$520	$3,120	$10,920
	b	6" Butterfly Valves, Manual	3	EA	$1,500	$4,500	$600	$1,800	$6,300
	c	8" Butterfly Valves, Electric Actuator, Open/Close	9	EA	$4,500	$40,500	$1,800	$16,200	$56,700
	d	8" Butterfly Valves, Electric Actuator, Modulating	1	EA	$5,500	$5,500	$2,200	$2,200	$7,700
	e	12" Butterfly Valves, Electric Actuator, Open/Close	7	EA	$5,000	$35,000	$2,000	$14,000	$49,000
	g	8" Butterfy Valve, Electric Acutator, Modulating, for EQ Basin	1	EA	$5,500	$5,500	$2,200	$2,200	$7,700

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST Tighe&Bond

Project: **Centennial Water Treatment Plant**
Location: **Pelham, MA**

Estimate Type: ☑ Conceptual ☐ Preliminary Design ☐ Design Development ☐ Construction ☐ Change Order ____ % Complete

Prepared By: CLS/JNM
Date Prepared: 10/8/2010
T&B Project No.: 10023324-01

Spec. Section	Item No.	Description	Qty	Units	Material/Installed Cost $/Unit	Material/Installed Cost Total	Installation $/Unit	Installation Total	Total
15765	5	Unit Heaters	1	LS	$14,000	$14,000			$14,000
15104	6	PVC Pipe							
15104	a	PVC Chemical Feed Piping for Release Line	200	LF	$10	$2,000			$2,000
15104	b	PVC Pipe (Splitter Box rehab)	1	LS	$2,500	$2,500			$2,500
15181	7	Hydronic Piping Partial Replacement	1	LS	$5,000	$5,000			$5,000
15511	8	Boiler, Associated Equipment	1	EA	$20,000	$20,000			$20,000
15700	9	HVAC System							
	a	Louvers	1	LS	$21,000	$21,000			$21,000
	b	Roof Ventilators	1	LS	$4,000	$4,000			$4,000
	c	Roof Fans	1	LS	$14,000	$14,000			$14,000
	d	Roof Fan and Intake for Raw Water PS	1	LS	$4,000	$4,000			$4,000
SUBTOTAL - DIVISION 15						**$199,300**		**$39,520**	**$238,820**
DIVISION 16 - ELECTRICAL									
16000	1	Miscellaneous Electrical	1	LS	$5,000	$5,000			$5,000
16120	2	Conduit & Cable to Package Pump Station	1	LS	$2,000	$2,000			$2,000
16122	3	Fiber Optics Cable							
	a	Fiber Optics Conduit and Cable to Package Pump Station	2,800	LF	$9	$25,200		$1,500	$26,700
	b	Fiber Optics Cable to Raw Water Pump Station (existing conduit)	1,000	LF	$2.00	$2,000		$1,000	$3,000
16500	6	Lighting							
	a	Interior Lighting, Rewiring	1	LS	$49,000	$49,000			$49,000
	b	Exterior Lighting, Rewiring	1	LS	$3,000	$3,000			$3,000
	c	Exit Lights, Wiring	1	LS	$3,000	$3,000			$3,000
	d	Signal Lights	2	EA	$750	$1,500			$1,500
	e	Emergency Lights, Wiring	1	LS	$9,000	$9,000			$9,000
	7	Ammonia Room Conversion to Explosion Proof	1	LS	$20,000	$20,000			$20,000
SUBTOTAL - DIVISION 16						**$119,700**			**$122,200**

CONSTRUCTION TOTAL COST	**$1,484,170**
ENGINEERING & CONTINGENCY (40%)	**$593,700**
TOTAL	**$2,077,870**
SAY	**$2,100,000**

NOTES

1 Subtract approximately $100,000 from final cost if metal panels are desired.
2 Subtract approximately $29,500 from final cost if UNISWEEP filter wash agitators are desired.
3 Subtract approximately $6,800 if using electric valves.
4 Subtract approximately $2,250 from final cost for each valve that is substituted with a pneumatic valve.